Trend Study 22-7-03

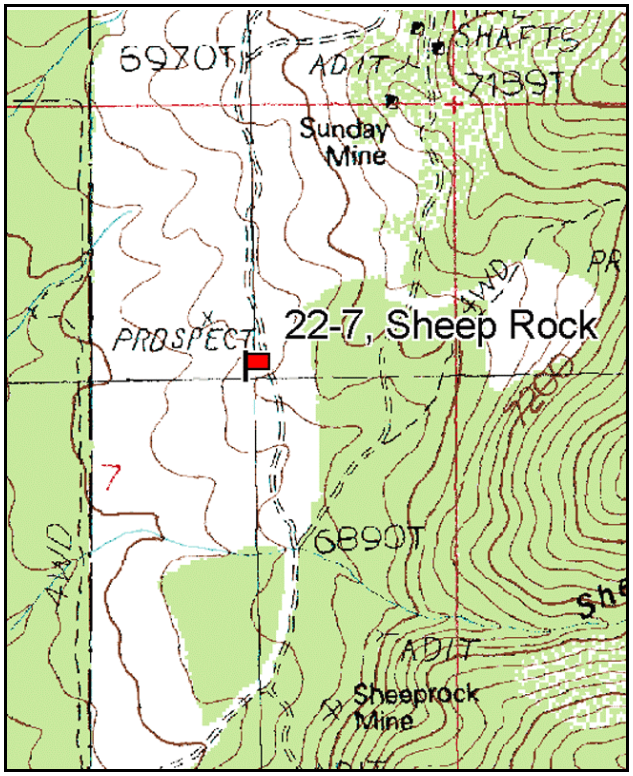
Study site name: Sheep Rock . Vegetation type: Chained, Seeded P-J .

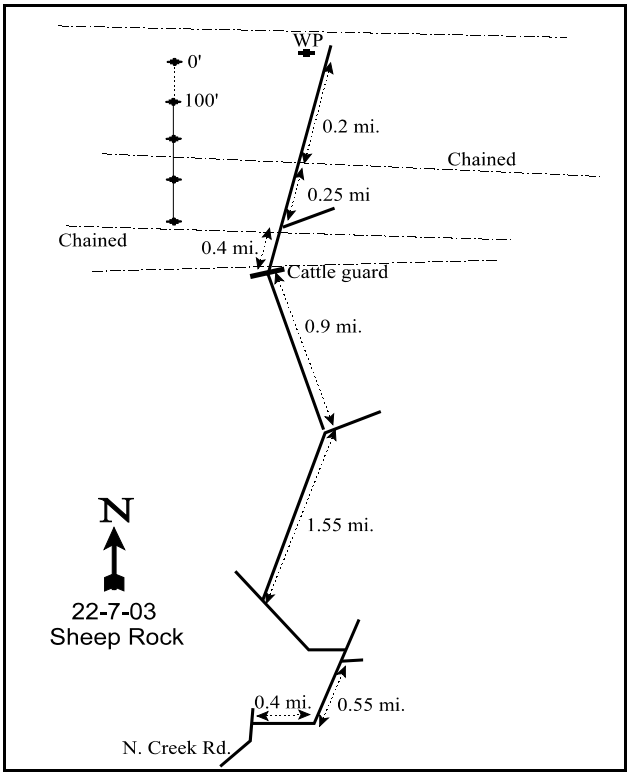
Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 2 on 2ft.

LOCATION DESCRIPTION

From the junction of SR 153 and North Creek Road (1200 E.) east of Beaver, proceed north on North Creek Road 5.0 miles to a fork. Keep to the right on the pavement and continue 0.4 miles to another fork. Turn left and drive 0.55 miles, crossing a bridge, to a fork in the road with a sheeprock sign. Turn left and after 100 yards take a sharp bend to the left to stay on the good road. Drive about 200 yards and keep to the right at another fork. Continue 0.175 miles and again keep right at a fork. Go 1.55 miles to a cattleguard and 0.15 miles beyond it to a fork. Turn to the left instead of crossing a cattleguard into a chained area. Drive 0.9 miles further to cross a cattleguard and enter the chained area. Go 0.4 miles to a fork and stay left. After 0.25 miles you will again enter directly into the chained area. Continue 0.2 miles into the chaining to a witness post on the left side of the road. The frequency baseline starts 195 feet west of the witness post. The 0-foot baseline stake is a short rebar with browse tag #7058 attached.





Map Name: Beaver

Diagrammatic Sketch

Township 28S , Range 6W , Section 7

GPS: NAD 27, UTM 12S 4249988 N, 362980 E

DISCUSSION

Sheep Rock - Trend Study No. 22-7

This study is located near the mouth of Sheep Rock Canyon on the gentle (5-10%) west sloping foothills of the Tushar Mountains at an elevation of 6,900 feet. The study samples a Forest Service chaining and seeding project completed in the fall of 1981. The 2-way chaining treatment effectively removed the pinyon-juniper overstory and the site is dominated by seeded perennial grasses. Fire has also been an influence as the site burned after the chaining. The fire consumed many of the downed pinyon-juniper snags and continued up the mountain into the untreated woodland. The lack of adequate browse species is the most notable effect of the past wildfire. One-quarter mile to the west is the BLM boundary and a 25-year old chaining. In some winters, deer spend much of the season at lower elevations. Judging from data collected at the nearby DWR Sheep Rock deer pellet group transect, use has been generally low on this site. With its abundance of valuable early season grasses, the area makes an excellent early spring range for mule deer and winter range for elk. A pellet group transect read on the site in 1998 estimated 12 deer days use/acre (30 ddu/ha) and 52 cow days use/acre (128 cdu/ha). Pellet group transect data collected in 2003 estimated 5 deer and 85 cow days use/acre (13 ddu/ha and 210 cdu/ha) on the site. Cattle use was from the 2002 grazing season while the few deer pellets sampled were from spring.

Soils are sandy loam in texture with a slightly acidic pH (6.5). Average effective rooting depth was just over 11 inches in 1998. Average soil temperature was estimated at 47°F at a depth of 15 inches in 1998, increasing to 66.6°F in 2003. The increase in soil temperature between years is mostly a function of soil moisture within the profile. With drought conditions prior to and including the 2003 survey, soil moisture was low resulting in increased soil temperature. Perennial grasses and their associated litter provide the majority of the ground cover on this site, although both of these categories were much lower in 2003 compared to earlier readings. Pavement is also abundant on the surface estimated at 21% in 1998 and 26% in 2003. Bare ground was very low in 1985 and 1998, but moderate in 1991 and 2003. Soils were given a stable to slightly eroding rating in 2003 from an erosion condition class assessment. Rill formation and pedestalling provide evidence of some erosion on the site.

With the exception of pinyon and juniper, browse has been limited on this site over the life of the transect. Preferred species such as mountain big sagebrush, serviceberry, curlleaf mahogany, true mountain mahogany, and bitterbrush are present in the area but at very low densities. Most of these species were not sampled in the transect other than being measured for height and crown. Gambel oak averaged about 300 stems/acre between 1998 and 2003 and shows only light use, good vigor, and no decadence. Point-center quarter data from 1998 and 2003 estimated combined pinyon-juniper density at around 60 trees/acre.

By far the most abundant and productive class of vegetation is the grasses. Grasses, annual and perennials combined, provided 85% of the total vegetation cover on the site in 1998. With drought conditions in 2003, grasses combined to provide only 43% of the total vegetation cover. Cheatgrass was very abundant in 1998, but significantly declined in frequency and average cover in 2003. The decline in cheatgrass is expected with dry conditions, but a significant decline in perennial grass cover in 2003 was not. Perennial grasses provided 30% average cover in 1998, but only 13% in 2003. Perennial grasses also declined in sum of nested frequency by 28% between 1998 and 2003. Declines in nested frequency and cover of perennial grasses in 2003 is due to livestock use and drought conditions resulting in poor production that did not allow grasses to recover from grazing. The most abundant perennial species are smooth brome, crested wheatgrass, and intermediate wheatgrass. The native Sandberg bluegrass increased in frequency in 2003.

In 1985, the only forbs identified were two seeded species, alfalfa and small burnet. At that time it was felt that the abundance of the highly preferred alfalfa would be an important indicator of range trend in the future. Alfalfa occurs only sparingly on the site now. This is the result of the effects of selective grazing as well as a

couple of drought cycles since alfalfa was seeded onto the site. The most abundant perennial forb in 1998 and 2003 was American vetch, and is of moderate to high palatability for wildlife and livestock. Annual forbs have become increasingly more abundant with each reading. Annual species include pale alyssum, little flower collinsia, annual stickseed, and little polecat.

1985 APPARENT TREND ASSESSMENT

The chaining and seeding was successful and trend appears upward for herbaceous species. Soils appear stable and protected by a variety of grasses. The grasses appear to be increasing in density, but not so much as to compete with the upcoming browse component. Several species of valuable deer browse are present and as they increase, the area will be even better for deer, although it is now excellent elk range.

1991 TREND ASSESSMENT

The trend for soil is down since vegetative basal cover has decreased to only 3%. Percent bare ground also increased from 9% to 26%. The large increase in percent bare ground and decreases in vegetational basal cover, pavement, and rock would indicate possible movement of soils across the soil surface. The browse trend is basically stable, but preferred species are very limited. Bitterbrush and Gambel oak have identical density estimates to 1985. The grasses of the herbaceous understory have a higher nested frequency value, but forbs are very scarce. Even with a slight decrease for forbs, they are still so scarce they are of little use on this site. Trend for herbaceous understory is up.

TREND ASSESSMENT
soil - down (1)
browse - stable (3)
herbaceous understory - up (5)

1998 TREND ASSESSMENT

Soil trend is upward. There is abundant vegetation and litter cover to protect from erosion at this time. Additionally, percent bare ground has decreased from 26% in 1991 to 7% in 1998. The browse trend is stable, but browse remains limited on the site. Gambel oak slightly increased in density in 1998, and 20 young mountain big sagebrush plants/acre were estimated as well. Photographs show that the pinyon and juniper trees are increasing in size over time. The herbaceous understory trend is upward. Sum of nested frequency for perennial grasses and forbs increased from 546 in 1991 to 749 in 1998. Although cheatgrass is present on the site, it should remain under control with the very competitive perennial species on the site.

TREND ASSESSMENT
soil - up (5)
browse - stable (3)
herbaceous understory - up (5)

2003 TREND ASSESSMENT

Trend for soil is down. Percent bare soil doubled, and vegetation and litter cover are significantly lower compared to 1998 levels. Perennial grass cover decreased from 30% to 13% due to drought conditions not allowing grasses to recover from the previous grazing season. Rills and pedestalling provide evidence of some erosion on the site. Trend for browse is stable, but as with the previous readings, preferred browse species remain limited on the site. Mountain big sagebrush slightly increased in density (20 to 100 plants/acre), while Gambel oak slightly declined. The site is dominated by seeded grasses crested and intermediate wheatgrass, and smooth brome. Trend for the herbaceous understory is down. Perennial grasses

show significant declines in both nested frequency and average cover. A significant decline occurred in the nested frequency of intermediate wheatgrass and smooth brome which are less drought tolerant than crested wheatgrass. Cover of intermediate wheatgrass and smooth brome dropped from 10% and 12% in 1998 respectively to about 3% in 2003. Perennial forbs have also declined in sum of nested frequency since 1998. The magnitude of the decline in perennial grass cover on this site was the largest for the management unit in 2003. Weedy annual forbs were very abundant in 2003. The one positive change in the understory in 2003 was the significant decline in cheatgrass.

TREND ASSESSMENT
soil - down (1)
browse - stable (3)
herbaceous understory - down (1)

HERBACEOUS TRENDS --
Management unit 22 , Study no: 7

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	$_{a}$89	$_{b}$136	$_{b}$170	$_{ab}$139	8.96	4.84
G	Agropyron intermedium	$_{b}$173	$_{c}$240	$_{b}$174	$_{a}$118	9.92	2.76
G	Agropyron spicatum	-	-	2	-	.03	-
G	Bromus inermis	$_{a}$95	$_{b}$135	$_{c}$219	$_{ab}$104	9.84	2.63
G	Bromus tectorum (a)	-	-	$_{b}$298	$_{a}$99	11.51	1.31
G	Elymus junceus	$_{b}$29	$_{ab}$11	$_{a}$4	$_{a}$1	.33	.03
G	Poa secunda	$_{a}$3	$_{a}$2	$_{b}$40	$_{c}$82	.91	2.80
G	Sitanion hystrix	$_{b}$22	$_{b}$18	$_{a}$4	$_{a}$-	.01	-
Total for Annual Grasses		0	0	298	99	11.51	1.31
Total for Perennial Grasses		411	542	613	444	30.01	13.08
Total for Grasses		411	542	911	543	41.53	14.39
F	Agoseris glauca	-	-	4	4	.01	.03
F	Alyssum alyssoides (a)	-	-	$_{a}$63	$_{b}$105	.16	1.63
F	Arabis spp.	-	3	5	-	.01	-
F	Arenaria spp.	-	-	-	1	-	.00
F	Astragalus convallarius	-	-	1	-	.03	-
F	Astragalus spp.	-	-	2	10	.00	.36
F	Camelina microcarpa (a)	-	-	$_{b}$17	$_{a}$2	.03	.03
F	Calochortus nuttallii	-	-	2	4	.00	.01
F	Chaenactis douglasii	-	-	1	-	.00	-
F	Collinsia parviflora (a)	-	-	$_{a}$56	$_{b}$212	.11	4.73
F	Crepis acuminata	-	-	1	3	.03	.03
F	Cymopterus spp.	-	-	1	1	.00	.00
F	Descurainia pinnata (a)	-	-	-	7	-	.03

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
F	Draba spp. (a)	-	-	12	13	.02	.03
F	Erodium cicutarium (a)	-	-	-	3	-	.03
F	Eriogonum racemosum	-	-	3	3	.03	.03
F	Gilia spp. (a)	-	-	a-	b53	-	.62
F	Holosteum umbellatum (a)	-	-	3	15	.01	.05
F	Lappula occidentalis (a)	-	-	a32	b76	.10	2.67
F	Leucelene ericoides	-	-	5	-	.15	-
F	Medicago sativa	b35	a-	a-	a1	-	.03
F	Microsteris gracilis (a)	-	-	a20	b175	.16	1.93
F	Orobanche fasciculata	-	-	2	-	.00	-
F	Phacelia spp.	-	1	-	-	-	-
F	Phlox longifolia	-	-	2	10	.01	.05
F	Polygonum douglasii (a)	-	-	5	-	.01	-
F	Ranunculus testiculatus (a)	-	-	a5	b65	.06	1.30
F	Sanguisorba minor	1	-	-	-	-	-
F	Streptanthus cordatus	-	-	-	5	-	.06
F	Tragopogon dubius	-	-	2	-	.00	-
F	Unknown forb-perennial	b20	a-	a-	a-	-	-
F	Vicia americana	a-	a-	c105	b67	2.28	1.44
Total for Annual Forbs		0	0	213	726	0.67	13.07
Total for Perennial Forbs		56	4	136	109	2.59	2.06
Total for Forbs		56	4	349	835	3.26	15.13

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 22 , Study no: 7

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Artemisia tridentata vaseyana	1	3	.63	.06
B	Gutierrezia sarothrae	0	1	-	.15
B	Juniperus osteosperma	2	4	1.79	1.72
B	Quercus gambelii	4	2	1.79	1.78
Total for Browse		7	10	4.21	3.73

CANOPY COVER, LINE INTERCEPT --
Management unit 22 , Study no: 7

Species	Percent Cover '03
Artemisia tridentata vaseyana	.56
Juniperus osteosperma	2.31
Quercus gambelii	1.79

POINT-QUARTER TREE DATA --
Management unit 22 , Study no: 7

Species	Trees per Acre	
	'98	'03
Juniperus osteosperma	47	36
Pinus edulis	15	25

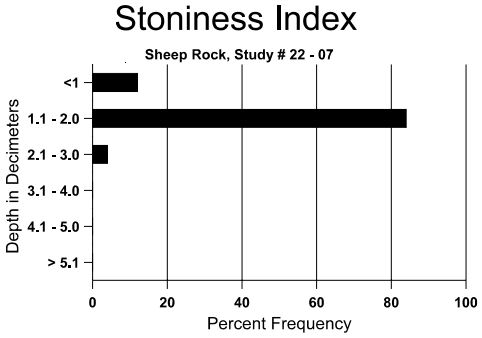
Average diameter (in)	
'98	'03
5.4	4.5
4.1	3.3

BASIC COVER --
Management unit 22 , Study no: 7

Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	10.50	3.00	48.07	36.65
Rock	1.50	2.50	3.09	3.19
Pavement	28.75	16.25	21.02	25.52
Litter	50.25	52.25	50.47	32.25
Cryptogams	0	0	.05	.01
Bare Ground	9.00	26.00	7.12	17.78

SOIL ANALYSIS DATA --
Management unit 22, Study no: 7, Study Name: Sheep Rock

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
11.2	66.6 (10.2)	6.5	54.0	28.4	17.6	3.0	10.0	172.8	0.9



PELLET GROUP DATA --
Management unit 22 , Study no: 7

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	6	14	-	-
Elk	1	-	-	-
Deer	4	4	12 (30)	5 (13)
Cattle	28	17	52 (128)	85 (210)

BROWSE CHARACTERISTICS --
Management unit 22 , Study no: 7

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Amelanchier utahensis											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	35/19
03	**0**	-	-	-	-	-	0	0	-	0	25/28
Artemisia tridentata vaseyana											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**20**	-	-	20	-	-	0	0	-	0	27/38
03	**100**	-	20	80	-	-	20	0	-	0	24/38
Cercocarpus ledifolius											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	37/48
Cercocarpus montanus											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	27/30
03	**0**	-	-	-	-	-	0	0	-	0	22/32
Chrysothamnus nauseosus hololeucus											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	35/66
03	**0**	-	-	-	-	-	0	0	-	0	39/64

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Chrysothamnus viscidiflorus											
85	**866**	-	133	733	-	-	0	0	-	0	13/11
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Gutierrezia sarothrae											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**266**	-	-	266	-	-	0	0	-	0	10/11
98	**0**	-	-	-	-	-	0	0	-	0	12/12
03	**20**	-	-	20	-	-	0	0	-	0	11/13
Juniperus osteosperma											
85	**66**	-	66	-	-	-	0	0	-	0	-/-
91	**66**	66	-	66	-	-	0	0	-	0	38/36
98	**40**	-	-	40	-	20	0	0	-	0	-/-
03	**80**	-	-	80	-	-	0	0	-	0	-/-
Pinus edulis											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	40	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Purshia tridentata											
85	**66**	-	66	-	-	-	0	0	0	0	-/-
91	**66**	-	-	-	66	-	0	100	100	100	-/-
98	**0**	-	-	-	-	-	0	0	0	0	-/-
03	**0**	-	-	-	-	-	0	0	0	0	19/47
Quercus gambelii											
85	**133**	-	133	-	-	-	0	0	0	0	-/-
91	**133**	-	133	-	-	-	100	0	0	0	-/-
98	**380**	-	100	260	20	-	0	0	5	0	44/30
03	**260**	-	-	260	-	60	0	0	0	0	56/30